OBSERVATIONS ON SOME SCARABAEOIDEA IN THE COLOMBIAN SIERRA NEVADA DE SANTA MARTA

H. F. Howden and J. M. Campbell

Biology Department, Carleton University, Ottawa, Ontario,
and Biosystematics Research Institute, Research Branch,
Canada Agriculture, Ottawa, Ontario

Abstract

The Scarabaeoidea fauna of the Sierra Nevada de Santa Marta of northern Colombia is briefly considered, particularly in relation to the geological history of the area. The habits of 3 species, *Heterogomphus dilaticollis* Burmeister, *Golofa porteri* Hope, and *Sphenognathus bellicosus* Boileau, are discussed in some detail.

In May, 1973, we spent 11 days on the San Lorenzo ridge of the Sierra Nevada de Santa Marta, Magdalena, Colombia. Our base was the Inderena Experiment Station at 7,000 feet. Collecting was largely limited to areas 6,000-8,500 feet in elevation within walking distance. The rains started approximately 3 weeks before our arrival, and during our stay it rained fairly regularly in the afternoons, with amounts varying from a trace to over 3 inches. Mornings were usually clear with the temperature averaging 70°F. Evenings were clear and cool, approximately 50°F, and often windy.

The area near the Inderena Station was largely either cleared or planted with pines and eucalyptus. One-half mile below the station (6,000-6,500 feet) there were patches of heavy forest; the presence of tree ferns indicated a cloud-forest formation (Fig. 1-2). Above the station (Fig. 3) and at the top of the ridge (8,000-9,000 feet) there were only scattered areas where the partly cut-over forest was accessible. Much of the ridge top was covered with grass, weeds, and scattered plantings of pine.

Since we were generally interested in Coleoptera, we utilized a variety of collecting techniques; i.e., observation, sweeping, beating (both during the day and at night), log and stone turning, sifting, black-light, malaise traps, and dung, carrion and fruit traps. From our experience in similar areas in South and Central America we expected to find a rich fauna, but results were disappointing. The fauna seemed quite depauperate, and in many ways resembled an insular one. We may have been too early in the season, but this would not account for the paucity of species in some groups, such as the Staphylinidae. Possibly the poor fauna may be explained by the historical aspects of the geology of the area.

The major uplift of the Sierra Nevada de Santa Marta to its present elevation of over 18,000 feet occurred in the relatively recent past (geologically speaking), within the last 3 or 4 million years. The range was formed by an uplift of an ancient plate and is not volcanic in origin. At least four-fifths of the surrounding area is quite low, with the Pliocene-Pleistocene base below current sea level. The nearest mountains, the Sierra de Perija, on the Colombian-Venezuelan border, lie to the south and east of the Sierra Nevada de Santa Marta, and since the prevailing trade winds blow from the northeast,

Fig. 1-4: (1-2) Cloud forest formations near Inderena Station, Sierra Nevada de Santa Marta, Colombia, 6,000-6,500 feet. (3) Forest above Inderena Station at 7,500 feet. (4) Males of *Golofa porteri* on growing shoots of bamboo at 8,500 feet.

Fig. 5-8: (5) *Heterogomphus dilaticollis* Burmeister, male. (6) "Turreted" burrow of *H. dilaticollis*. (7) *Golofa porteri* Hope, male. (8) *Sphenognathus bellicosus* Boileau, male.

there appears to be little chance of wind transport of small insects from adjacent high areas.

The recent uplift and relative isolation could account for the depauperate fauna in the 6,000 to 8,500 foot levels of the San Lorenzo Ridge. At lower elevations (2,000-5,000 feet) there is a much richer fauna. Endemism is moderate at levels above 3,000 feet, but mainly at the species level, indicative of a relatively short period of isolation. This seems to support the concept of an insular, relatively recently uplifted area as an explanation for the lack of species diversity.

The distribution of the scarab fauna illustrates the general pattern. At 3,500 feet on the road to San Lorenzo near the settlement of Campana, 35 species of Scarabaeidae were taken on dung or at black-lights during an afternoon and evening of collecting. Only 1 species, in the genus *Golofa,* also occurred at 7,000 feet, where 1 specimen was taken at black-light. With this 1 exception the elevational differences were complete, the faunal shift appearing to occur between 5,000 and 6,000 feet. Between 6,000 and 8,500 feet there seemed to be little change, and the following genera of Scarabaeidae were taken: *Eurysternus* (1 species), *Canthidium* (1 species), *Uroxys* (1 species), *Onthophagus* (1 species), *Aphodius* (1 species), *Pseudoserica* ? (1 species), *Macrodactylus* (1 species), *Anomala* (1 species). *Ancognatha* (2 species), *Cyclocephala* (1 species), *Megacerus* (1 species), *Heterogomphus* (2 species), *Dynastes* (1 species), *Golofa* (2 species); and in Lucanidae, *Sphenognathus* (1 species). The first 5 genera listed were taken in dung or carrion traps. The *Pseudoserica* (?) was taken beating and at light between 7,000 and 8,000 feet. The *Anomala* and *Macrodactylus* were diurnal, the *Macrodactylus* being very common at the station flying along grassy banks and resting on moss-covered rocks. *Ancognatha vulgaris* Arrow and a black *Ancognatha* sp., *Cyclocephala, Megacerus jason* Hbst., *Heterogomphus rugicollis* Prell, *Dynastes neptunus* Quen., and a small *Golofa* were collected only at light. The *Megacerus, Heterogomphus,* and *Dynastes* were found at the lights of the Telecom station at 8,000 feet near the top of the ridge; the remaining species were taken at both the Telecom and San Lorenzo Stations. More detailed observations were made on 3 species, 2 Dynastinae and 1 Lucanidae.

While collecting along the San Lorenzo road between 6,000 and 8,500 feet, we found numerous fragments of the moderate-sized dynastid, *Heterogomphus dilaticollis* Burm. (Fig. 5). The fragments usually consisted of the head, pronotum, forelegs, and occasionally one elytron. Often, in the early morning, the forelegs and antennae of the fragments were still moving. In areas where numerous fragments were found, a number of odd "turreted" burrows (Fig. 6) were noted. The burrows were open, about 15 mm in diameter, with the rim 15 to 30 mm above the surrounding ground level. Investigation showed that the burrows were made by *Heterogomphus dilaticollis.* The majority of burrows were along the roadside in the compacted pebbly-clay soil, and 1 burrow was found in the center of the gravel road. The burrows, not including the "turret", were irregularly vertical for approximately 16 to 24 cm, then turned toward the horizontal for 6 to 8 cm. Because of rocks and roots, some burrows were quite sinuous, and in almost all cases the horizontal portion of the burrow terminated under a large rock or root, making excavation difficult. Because of these obstructions, only 15 burrows were fully excavated. Each of these yielded a male *dilaticollis.* The only live female seen

was walking across the road, and it was not determined whether females make similar burrows. The males apparently utilize the burrows over a period of days, since burrows we disturbed were subsequently reopened. We also noted a moderate-sized fox-like canid (*Dusicyon*?) attempting to dig out the beetles; and this animal is apparently the major predator, not only of *dilaticollis,* but of other dynastids in the area.

On the San Lorenzo range, from approximately 6,500 feet to the top of the ridge, there were scattered clumps of bamboo or a bamboolike grass. This plant formed very thick clumps, often 20 to 30 feet high and very dense. However, fresh growth was evident in nonleafy stalks that extended above the main clump of vegetation for 2 or 3 feet. On 1 clump of the "bamboo", at 8,500 feet, we found 18 males of *Golofa porteri* Hope (Fig. 7). Each male was on a separate stalk, facing downward, approximately 3 to 5 inches below the growing tip (Fig. 4). The *porteri* were actively feeding on the stalk, and several nearly severed stalks were seen. While contemplating the best method of collecting the specimens, we heard a "clicking, squeaking" noise and after moving around the clump we saw 2 males on a single stalk fighting. One male was considerably larger than the other and was above the smaller specimen facing downward. Each male had its head lowered, so that the long, slender head horn extended directly forward. They grappled with their elongated forelegs, as each attempted to place the head horn under the opponent. At the same time, both males were vigorously sonifying, their abdomens moving up and down. The "battle" was observed for approximately 1 minute, when suddenly the larger male successfully placed his head horn under his opponent and flipped him off the stalk. The victor then resumed feeding, while the vanquished smaller male flew to the base of another stalk. The small male started to ascend the new stalk on which a very large male was facing downward near the terminus. The small male approached to within a foot of the larger one before its presence was observed. The large male extended its forelegs, lowered its frontal horn and sonified vigorously. The small male immediately stopped its upward progress, remained completely still for perhaps 15 seconds, and then flew off to an unoccupied stalk. Subsequent observations were halted by the advent of the afternoon rains. We collected a number of the specimens, but missed others that flew off when we disturbed the clump. Since there were no females in the clump of "bamboo", we can only conclude that the aggressive behaviour noted was in defense of a "feeding territory", and was not related to courtship. We did find a female *porteri* in another clump of "bamboo", 50 yards away, but there was no associated male. *Golofa porteri* seemed to be largely diurnal, flying early in the morning, but a few specimens, particularly females, were taken at the lights of the Telecom Station.

Another largely diurnal species was the lucanid, *Sphenognathus bellicosus* Boileau (Fig. 8). We first found this species along the road below the San Lorenzo Station at 6,500 feet. During the first week we found 5 specimens, either in the road (in several instances upside down) or on roadside vegetation. Several other specimens were seen flying near the top of the tree canopy along the road. We believed the species to be uncommon until we worked 2 narrow saddles along the top of the ridge at 8,500 feet. The length of the saddles was approximately 100 feet, with the ridge abruptly rising to 300 to 500 feet on either end. The sides of the saddles, which barely accommodated the road, fell away steeply for nearly 1,000 feet on either side to relatively heavily forested

areas. Along the saddles were a number of woody shrubs with numerous stems forming a clump 8 to 10 feet high. The majority of clumps housed from 1 to 5 male *Sphenognathus* (Fig. 8). There was no indication of any feeding or other activity. Apparently the concentration of specimens was due to a combination of a tendency to fly uphill plus wind patterns which concentrated specimens at the saddles. Thirty-five specimens were found, all males. *Sphenognathus bellicosus* is of particular interest, since it is the only species we collected among the larger, high elevation scarabaeids that is endemic to the Santa Marta range.

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RANGE EXTENSION FOR *PASIMACHUS SUBLAEVIS* BEAUVOIS (COLEOPTERA, CARABIDAE)

Paul S. Miliotis

R. F. D. 1, Dunstable, Massachusetts

A specimen of *Pasimachus sublaevis* Beauv. was collected in open sand dunes of Monomoy Island, Cape Cod, Massachusetts on 8-X-1973 (det. Ross T. Bell). A search for other specimens in a collection of Coleoptera from Monomoy Island, made by Robert Baird, yielded 4 additional specimens.

This species is apparently unrecorded from Massachusetts. Banninger (1950) recorded the distribution as New York and New Jersey to Florida, west to Illinois and Indiana. No Massachusetts records could be found in the collections of the Museum of Comparative Zoology, Cambridge, Mass. or the National Museum of Natural History, Washington, D. C. (Dr. Terry L. Erwin, personal comm.), the most northerly records being several Long Island, New York specimens in the National Museum.

Specimens are deposited in my own collection and that of Dr. Ross T. Bell, University of Vermont.

References Cited

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